


EXHIBIT J1



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BODIESORBITS_EPHEMERIDES_TOOLS_PHYSICAL DATA_DISCOVERY_FAQ_SITE MAP

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JPL Small-Body Database Browser

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7272 Darbydyar (1980 DD1)
Classification: [Main-belt Asteroid](#) **SPK-ID:** 2007272
[\[Ephemeris \]](#) [\[Orbit Diagram \]](#) [\[Orbital Elements \]](#) [\[Mission Design \]](#) [\[Physical Parameters \]](#) [\[Discovery Circumstances \]](#) [\[Close-Approach Data \]](#)

[\[show orbit diagram \]](#)

Orbital Elements at Epoch 2458600.5 (2019-Apr-27.0) TDB
Reference: JPL 25 (heliocentric ecliptic J2000)

Element	Value	Uncertainty (1-sigma)	Units
a	1.019094902958069	3.8632e-08	
Δ	2.779278758295437	1.388e-08	au
q	2.496043876647586	1.0848e-07	au
i	9.63870722365569	4.9814e-06	deg
node	30.26914824064693	2.5129e-05	deg
peri	208.1720849814303	3.4419e-05	deg
M	99.45406237613744	2.3428e-05	deg
t₀	2458132.962321896823 (2018-Jan-14.46232190)	0.00010999	TDB
period	1692.374952775464	1.2677e-05	d
	4.63	3.471e-08	yr
n	.2127188182557337	1.5935e-09	deg/d
Q	3.062513639943288	1.5294e-08	au

Orbit Determination Parameters

# obs. used (total)	1789
data-arc span	24372 days (66.73 yr)
first obs. used	1952-01-30
last obs. used	2018-10-22
planetary ephem.	DE431
SB-pert. ephem.	SB431-N16
condition code	0
norm. resid. RMS	.48778
source	ORB
producer	Otto Matic
solution date	2018-Oct-30 16:45:48

Additional Information

Earth MOID	= 1.48937 au
Jupiter MOID	= 1.94242 au
T_{Jup}	= 3.306

[\[show covariance matrix \]](#)

[\[Ephemeris \]](#) [\[Orbit Diagram \]](#) [\[Orbital Elements \]](#) [\[Mission Design \]](#) [\[Physical Parameters \]](#) [\[Discovery Circumstances \]](#) [\[Close-Approach Data \]](#)

Physical Parameter Table						Notes
Parameter	Symbol	Value	Units	Sigma	Reference	
absolute magnitude	H	12.6		n/a	MPO412231	
diameter	diameter	8.040	km	0.594	urn:nasa:pds:neowise_diameters_albedos::2.0[mainbelt] (http://adsabs.harvard.edu/abs/2012ApJ...759L...8M)	
rotation period	rot_per	30.334	h	n/a	LCDB (Rev. 2019-January); Warner et al., 2009	Result based on less than full coverage, so Published Reference List: [Waszczak, A.; Chang, C.-K.; Ofeck, E.O.; L
geometric albedo	albedo	0.273		0.047	urn:nasa:pds:neowise_diameters_albedos::2.0[mainbelt] (http://adsabs.harvard.edu/abs/2012ApJ...759L...8M)	

7272 Darbydyar Discovered 1980 Feb. 21 by Z. Vavrova at Klet.
M. Darby Dyar (b. 1958) is a professor at Mount Holyoke College who specializes in Mössbauer spectroscopy of terrestrial and extraterrestrial material. Data from her laboratory have measurements by the Mars Exploration Rovers.
NOTE: some special characters may not display properly (any characters within {} are an attempt to place the proper accent above a character)
Reference: 20070730/MPCPages.arc

[\[show close-approach data \]](#)

Alternate Designations
1980 DD1 = 1971 KO = 1991 RG6

[\[Ephemeris \]](#) [\[Orbit Diagram \]](#) [\[Orbital Elements \]](#) [\[Mission Design \]](#) [\[Physical Parameters \]](#) [\[Discovery Circumstances \]](#) [\[Close-Approach Data \]](#)

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